Jl S. Afr. Bot. 43 (3): 223–230 (1977)

THE INFLORESCENCE OF *JUBAEOPSIS CAFFRA* BECC.

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Abstract

Jubaeopsis caffra is monoecious but both sexes occur on the same inflorescence. The inflorescence of this polycarpic, cespitose palm is borne laterally and is initially enclosed within two woody bracts. Male and female flowers occur either separately or, more commonly, together in a triad of one female and two male flowers. Basically the inflorescence is paniculate, with the first order branching being monopodial. Each flower in the ultimate floral unit, i.e. the triad, is subtended by a bracteole, indicating that this unit represents a condensed branching system. It is suggested that the branching in this unit is sympodial and that the triad is a cincinnus.

Uittreksel

DIE BLOEIWYSE VAN *JUBAEOPSIS CAFFRA* BECC.

Jubaeopsis caffra is eenhuisig. Beide geslagte kom egter op een bloeiwyse voor. Die bloeiwyse van hierdie polikarpiese, polvormige palm word lateraal gedra en word aanvanklik deur twee houtagtige skutblare omhul. Manlike en vroulike blomme kom òf enkel òf, meer algemeen, saam in 'n triade van een vroulike en twee manlike blomme voor. Basies is die bloeiwyse 'n blompluim met die eerste orde van vertakking monopodiaal. Elke blom in die uiteindelike blom eenheid d.i. die triade word deur 'n skutblaar gedra wat aandui dat dié eenheid 'n gedronge vertakkingssisteem verteenwoordig. Daar word voorgestel dat dié vertakking simpodiaal is en dat die triade 'n sinsiniese byskerm is.

Introduction

In view of the fact that floral morphology was the most important criterion used by taxonomists for the classification of Angiosperms during the early part of this century, Beccari (1913) described the flowers of *Jubaeopsis caffra* in great detail in his original classification of this species. It would thus be superfluous to present a description of the floral morphology here.

Beccari (1913) did not, however, deal with the morphology of the inflorescence as a whole in any great detail, and in the light of recent publications in respect of palm inflorescences (Tomlinson & Moore, 1968; Tomlinson, 1970) a study of this aspect of *J. caffra* was considered justified.

Material

The material used in this study was obtained from a 43 year old, cultivated *J. caffra* tree growing in St. George's Park, Port Elizabeth and from trees in the *Jubaeopsis* groves along the Mtentu and Msikaba estuaries in Pondoland.

Results and Discussion

Like in all other palms (Tomlinson & Zimmerman, 1966), *J. caffra* passes through three phases during its ontogeny, viz. a juvenile stage of establishment

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Accepted for publication 11th February, 1977.

growth, an adult phase of vegetative growth and a reproductive phase during which inflorescences, flowers and fruits are produced. It must be noted though that each stem of this cespitose palm passes through these three stages separately and while some trunks of a particular tree will already be in the third phase, the younger suckers might still be in the first or second phase. In the specimen growing in St. George's Park for example, only half of the stems are in fact in the reproductive phase.

The inflorescences are borne laterally (Fig. 1) and develop from buds in the axils of the foliage leaves. In view of the fact that this species is polycarpic and the flowering does not inhibit the vegetative growth, its flowering is pleonanthic.

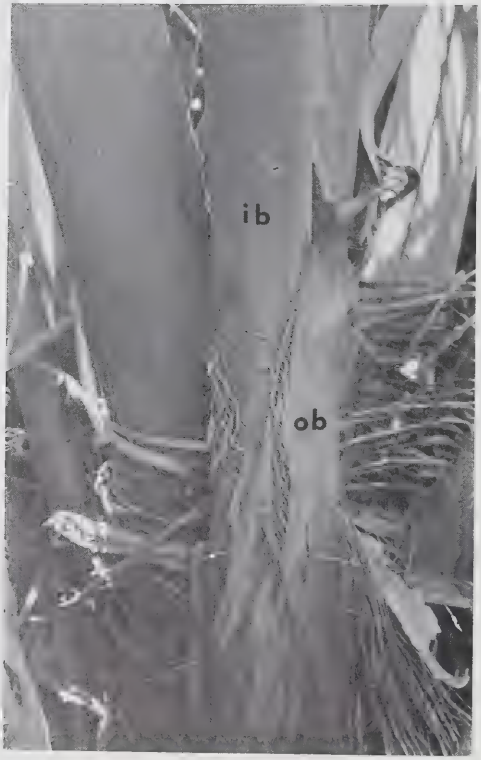


Fig. 1

The two bracts which envelope the inflorescence of *Jubaeopsis caffra*. (ib—inner woody bract; ob—prophyll or outer bract).

Development of the inflorescence is acropetal and the flowering does not inhibit the vegetative growth of the plant as a whole.

Beccari (1913) describes the inflorescence of *J. caffra* as a spadix enclosed in a woody spathe. Corner (1966) also uses this terminology for palm inflorescences in general and equates the inflorescence of the Palmae with the spadix of the Araceae.

Tomlinson (1970) condemns the application of these terms, i.e. ''spadix'' and ''spathe'' to the inflorescences of palms because, apart from the fact that the thickened rachilla of some palms is morphologically incomparable to the fleshy spadix of Araceae, the ultimate unit of the palm inflorescence is very often a series of condensed branches and is not a single spike.

In *J. caffra* the inflorescence is basically paniculate (Fig. 2) consisting of a

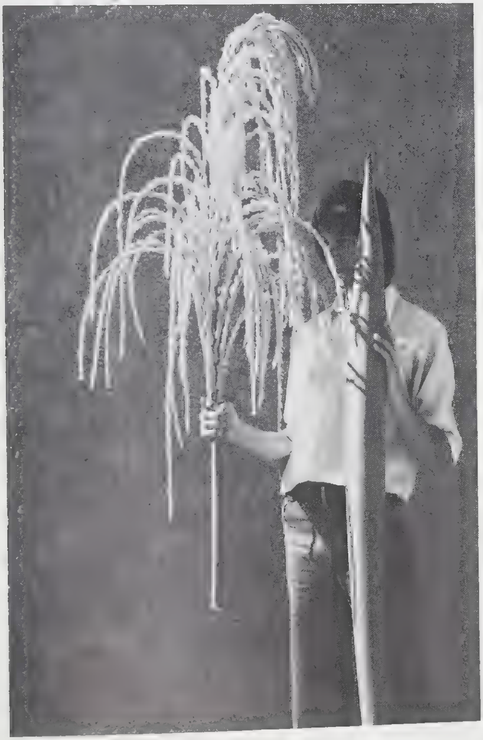


FIG. 2
The open, paniculate inflorescence and outer bract of *J. caffra*

thick central axis which branches monopodially to give rise to the rachillae. (The term ''rachilla'' refers in this article to the visible ultimate axis). These rachillae, which are first order branches, are arranged alternately on the main axis of the inflorescence and exhibit the same phyllotaxy as the foliage leaves on the stem.

J. caffra is monoecious but with both sexes occurring on the same inflorescence. The flowers are all sessile, and occur mostly in triads, i.e. a single central female flower flanked laterally by two male flowers and are borne on the rachillae (Fig. 3). Solitary male flowers however also commonly occur, especially in the distal portions of the rachillae, while more rarely, the extreme proximal flowers are solitary female flowers. Although no female flowers occur in the distal regions of the rachillae themselves, they do occur over the entire length of the inflorescence as a whole. This is best observed after fruit-set (Fig. 4).

As in all other cocosoid palms, the inflorescence of *J. caffra* is initially enclosed within two large bracts (Fig. 1). The fibrous outer bract which is between

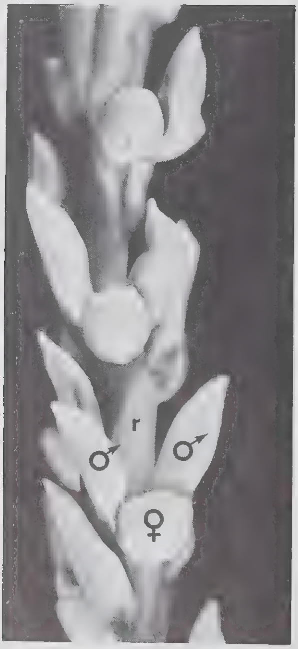


Fig. 3
The ultimate unit of the inflorescence, viz. a triad of two lateral male flowers and a centrally placed female flower (r—rachilla).

300 and 400 millimetres long constitutes the prophyll of the axillary branch, i.e. the inflorescence. It would seem that the primary function of this first bract is to protect the inflorescence until it has emerged from between the leaf sheaths. Thereafter, the prophyll is split as the second bract emerges. This latter bract is very much larger than the prophyll and attains a length of 1,0 to 1,5 metres. Initially the development of the inflorescence appears to be limited to elongation of the main axis, and during the early stages of development the second bract has a sword-like appearance. Once the inflorescence has achieved its maximum length though, the distal section of the second bract swells as the flowers develop. When the flowers are mature, this thick woody bract splits longitudinally and collapses from its erect position to a hanging one and thus exposes the large, cream-coloured inflorescence.

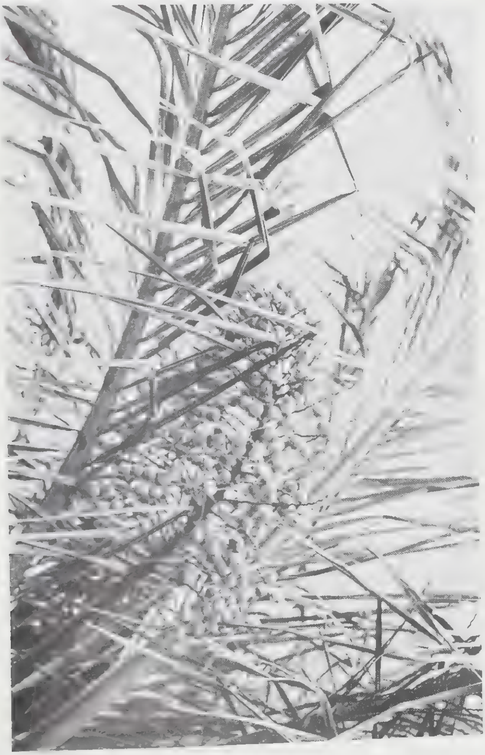


Fig. 4
A bunch of *J. caffra* fruits

Tomlinson (1970) states that in palms generally there is a tendency towards the reduction in the number of bracts in an inflorescence. Correlated with this reduction in number is an increase in size of the bracts. He reports further that in the inflorescences of all cocosoid palms, only two bracts occur, viz. a prophyll and a large, sometimes woody, bract as described above for *J. caffra*.

However, apart from each rachilla in the inflorescence of *J. caffra* being subtended by a bract, albeit a very much reduced structure, each triad and each individual flower in the triad is subtended by a bract and bracteole respectively (Fig. 5A).

The ultimate unit of this inflorescence, is as described above, a triad. This triad consists of a series of highly condensed branches, each subtended by a bracteole and each bearing a single flower, probably terminally (Figs. 5A–C).

Because of the acute congestion of this system it was impossible to establish whether branching is monopodial or sympodial. However, in view of the fact that the ultimate branch units in palm inflorescences are almost invariably cymose, i.e. sympodially branched (Tomlinson, 1970) it seems likely that this might be the case in *J. caffra* as well and that the triad of *J. caffra* is in fact a cincinnus (Fig. 5C).

It appears that the structure of the ultimate floral unit of *J. caffra* is similar to that described by Tomlinson & Moore (1968) for *Nannorrhops ritchiana* which Tomlinson (1970) considers as the basic type of unit for the Palmae in general.

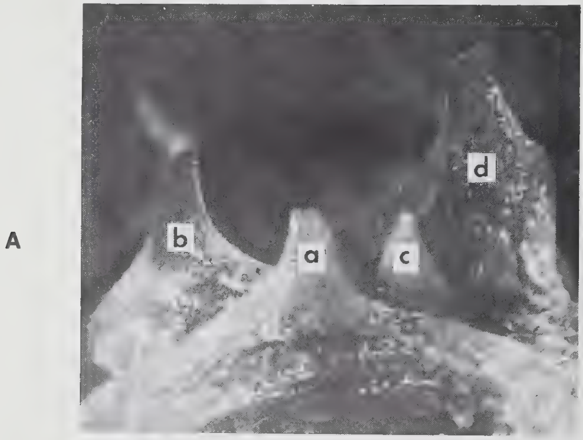
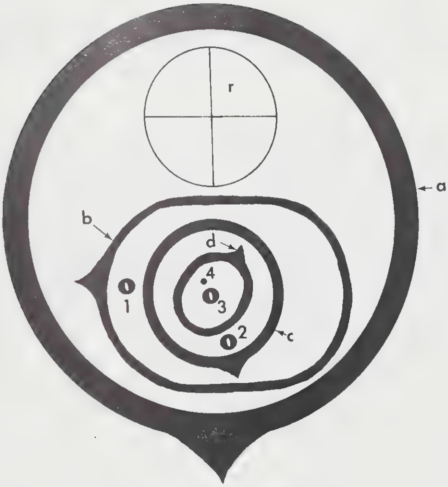


Fig. 5

A. Bract and Bracteoles present in the floral triad of *J. caffra*.

B & C. Schematic representations of the proposed ultimate unit of the inflorescence (1 & 2—lateral male flowers; 3—central female flower; 4—dormant axillary bud; a—bract; b–d—bracteoles; r—rachilla).

B



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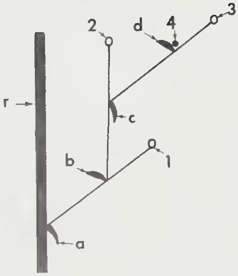

ACKNOWLEDGEMENTS

This study was supported by research grants from the University of Port Elizabeth and the C.S.I.R.

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